

TABLE 2.—Free-air resultant winds (meters per second) based on pilot-balloon observations made near 7 a. m. (E. S. T.) during June, 1929—Continued

Altitude m. s. l.	Medford, Oreg. (446 meters)		Memphis, Tenn. (145 meters)		New Orleans, La. (25 meters)		Omaha, Nebr. (313 meters)		Royal Center, Ind. (225 meters)		Salt Lake City, Utah (1,280 meters)		San Francisco, Calif. (60 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (67 meters)		Washington, D. C. (34 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
<i>Meters</i>	°		°		°		°		°		°		°		°		°		°	
Surface	N 24 W	0.5	S 76 E	1.8	N 33 E	0.5	S 28 E	0.9	S 20 E	0.8	S 12 E	2.4	S 6 E	0.4	N 81 E	0.6	S 43 E	0.8	N 76 W	0.3
500	N 29 W	0.7	S 44 W	3.6	S 58 E	1.2	S 5 W	2.5	S 45 W	2.5			N 17 W	2.6	S 63 W	1.6	S 28 E	0.6	N 27 W	2.6
1,000	S 76 W	0.6	S 74 W	4.3	S 20 E	1.8	S 56 W	5.2	W	4.0			N 3 W	3.9	N 83 W	3.5	S 7 W	1.2	N 28 W	2.2
1,500	S 13 W	1.7	S 80 W	4.5	S 18 E	1.6	S 79 W	5.1	N 89 W	5.0	S 12 E	3.4	N 20 W	2.9	N 75 W	4.5	S 35 W	1.8	N 41 W	3.6
2,000	S 59 W	2.3	N 79 W	4.1	S 23 E	1.6	S 86 W	5.5	N 80 W	5.6	S 7 W	4.2	N 36 W	2.7	N 78 W	5.7	S 17 W	1.8	N 53 W	6.2
2,500	S 72 W	4.5	N 71 W	3.3	N 88 E	0.8	N 81 W	6.3	S 89 W	5.1	S 32 W	3.8	N 69 W	3.1	N 74 W	7.6	S 25 W	3.0	N 62 W	6.2
3,000	S 79 W	5.9	N 68 W	2.8	N 68 E	1.3	N 72 W	7.5	N 32 W	6.2	S 51 W	4.5	N 72 W	4.6	N 67 W	8.3	S 59 W	4.7	N 65 W	6.7
4,000	S 80 W	9.6	N 38 W	3.8	N 27 E	2.5	N 52 W	12.6	N 72 W	10.5	S 54 W	6.2	N 87 W	6.5	N 60 W	10.0	S 70 W	5.3	N 47 W	7.9
5,000	S 50 W	12.6	N 28 W	4.0	N 14 E	3.0			N 79 W	11.8	S 82 W	8.8	S 86 W	7.7					N 66 W	7.2

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WEATHER IN THE UNITED STATES

THE WEATHER ELEMENTS

By P. C. DAY

GENERAL SUMMARY

June, 1929, was unmarked by important variations from normal summer weather, and, on the whole, was not physically uncomfortable, save in a few localities. It was generally favorable for the occupations of the season and conducive in the main to the favorable development of crops and the orderly progress of business.

PRESSURE AND WINDS

The pressure changes during the month were unusually slight from day to day and cyclonic storms that preserved their identity sufficiently from day to day to permit of charting on successive days were the exception.

The month opened with rainy conditions existing during the preceding 24 hours over a considerable area in the southern Rocky Mountains and Great Plains region, some heavy rains having fallen in the lower Missouri Valley, and local heavy rains had occurred also at a few scattered points in Virginia, Florida, and Alabama. The following day local showers continued in the Missouri Valley, extending into the upper Mississippi Valley, with heavy falls at points in Iowa and southern Illinois. By the morning of the 3d the main precipitation area had advanced to the south Atlantic coast with fairly well-defined cyclonic formation, attended by rather general and locally heavy precipitation over the Southeastern States, and showers still continued in portions of the central valleys. The rainy conditions in the Southeast passed off the coast by the morning of the 4th and fair weather prevailed over most districts for several days.

At the morning observation of the 7th rain had set in over the middle Plains, becoming locally heavy in a few instances, and by the following morning rain had extended into many eastern sections, becoming heavy locally in widely separated portions of the Mississippi and Ohio Valleys and Gulf States, the rains continuing on the 9th in portions of the Atlantic Coast States where, during the following 24 hours, there was some evidence of an increase in the cyclonic development as it passed northeastward up the coast, though without any extensive precipitation.

By the morning of the 11th rainy conditions had overspread portions of the northern districts from the Rocky Mountains to the upper Lakes, though without important precipitation except in portions of the last-named region.

During the following day the pressure continued low to the eastward and local thundershowers prevailed over extensive areas in the upper Mississippi Valley, Lake region, and northern drainage of the Ohio River, thundershowers with high winds and destructive hail storms being reported from numerous points in Iowa and portions of near-by States. This area of atmospheric disturbance continued during the following day, becoming rather general over the Ohio Valley with some heavy rains at points in Tennessee and near the lower Ohio River, showers continuing during the 14th over a rather extensive area from the upper Lakes southward to the middle Gulf coast, and to some extent over the Atlantic coast districts on the following day or two.

The latter half of the second decade was without important precipitation, save that on the 19th showers were reported from scattered points in the Southeastern States, locally in the Mississippi Valley and upper Lakes region, and in the far Northwest, and showers continued during the following day in the same or near-by areas.

During the first half of the last decade precipitation was scattered and mostly light to eastward of the Rocky Mountains and practically none occurred to the westward. On the 25th showers were fairly general in the southern Plains and to eastward of the Mississippi River, heavy rains occurring in portions of the Gulf States, particularly in western Florida and southern Alabama and in Arkansas and near-by portions of Texas. Showers continued during the following day over the more eastern part of the rain area and in the district from the upper Lakes westward to the Rocky Mountains, though here the precipitation was mostly in the form of light showers.

On the 27th showers prevailed in many portions of the Southeastern States and also in the near Northwest, the rains becoming light, however, in this area. During the following day the precipitation area extended eastward into the Great Lakes region and northern Ohio drainage with local heavy rains at points in Wisconsin and Michigan, and another rain area developed over the Gulf coast district, the combination of the two rain areas covering the more eastern portions of the entire country by the following morning.

At the close of the month the main agricultural areas of the country were not greatly in need of rain where it may usually be expected at that season of the year. While no great barometric depressions favored the occurrence of high winds over extensive areas, yet local storms were numerous and occurred at some point east of the Rocky Mountains on practically every day of the month,

though few assumed the violence and destruction of tornadoes and the loss of life from this source was comparatively light, though property damage was rather widespread, both from wind and hail. A list of the more important local storms with some of their details appears at the end of this section.

The average sea-level pressure for June was mainly above normal in the interior and northern sections and below normal over most eastern districts and locally in the South and far Northwest. In Canada the average pressure appears to have been less than normal.

The barometric change from the preceding month was everywhere negative and this applies to Canada as far as observations disclose. These changes were comparatively large in nearly all districts, ranging from 0.10 to 0.25 inch in the central valleys and near-by Canadian sections.

TEMPERATURE

Moderate temperatures were the rule throughout the month; on only a few dates were the 24-hour changes in excess of 20° and these were confined to the more northern districts.

The most important changes were on the 1st, from the upper Lakes eastward, when changes to cooler ranged up to 28° at points in Wisconsin, Michigan, and northern New York, and on the following day changes up to 20° or more were noted at points in the interior of the country from the Middle Plateau eastward to near the Atlantic coast. Rather important changes to cooler were noted on the 12th, when high pressure dominated the upper Lake region, and temperature falls of more than 30° were reported from points in the northern portions of Wisconsin and Michigan. At no time, however, were the important agricultural districts threatened with temperatures sufficiently low to endanger staple vegetation, except at the beginning when freezing temperatures were noted at points in the Appalachian Mountains and also in the higher western mountains.

The average temperatures for the period covering the 4th to 11th were cooler than normal over the eastern half of the country and along the Pacific coast, and generally warm over the Rocky Mountain and near-by areas, though the excesses were not large. In the central eastern area the negative values ranged up to 9° and similar values were noted in the Great Valley of California. The period, 11th to 18th, was mainly cool in the far West, particularly in the Plateau region. It was warm in the Northeast and somewhat warmer than normal over most Rocky Mountain districts, and only slightly variant from the normal in the Great Plains, central valleys, and Southeast. The week ended June 25 had some cool weather during the early part in the far West and Northwest, and the week, as a whole, was cooler than normal from the central parts of Oregon and Washington eastward to the upper Mississippi Valley, the area covered by the upper Missouri Valley and North Dakota averaging from 6° to 9° cooler than normal. Over other parts the averages were everywhere higher than normal and decidedly so at points in the central and coast districts of California and in the Northeastern States, where the positive departures ranged up to as much as 9° to 12° per day. The last five days of the month continued unusually warm over most of the western half of the country, the period being particularly warm over the Plateau States and

eastern California. From the Rocky Mountains eastward the period was cooler than normal, but the negative departures were not large.

For the month, as a whole, the average temperatures were below normal by small amounts over most of the country, a small area in the Southwest, however, having averages uniformly above the normal and scattered areas in many far-western sections had localities with temperatures above the normal for the month, and a small area in the Northeastern States had temperatures likewise warmer than normal. In no extensive areas, however, were the temperatures more than 2° or 3° above or below the respective normals.

The highest temperatures were recorded mainly during the last decade, though in a few States they were recorded earlier. The maximum record for the month, 125°, occurred at a point in Arizona, but a temperature of 124° was recorded in the desert regions of California and maximum temperatures of 100° or above were recorded at some time during the month in most of the States.

The lowest temperatures were generally recorded during the first decade and mainly in the early part. The minimum recorded, 7°, occurred at a point in the high mountains of Colorado, and temperatures below freezing were recorded in the elevated portions of practically all the western Mountain States and at exposed points in most States along the northern border.

Although there were no sharp falls in temperature the minimum readings on the 3d and 4th reached unusually low points in a few places, notably at New York, where the reading of 44° was the lowest ever observed in June, while Raleigh, N. C., with 49° on the 4th, had the lowest so late in the season.

PRECIPITATION

The total precipitation for the month was not excessive to any great extent though in parts of California it was unusually heavy for the time of the year locally in some of the northern sections. Generally speaking, precipitation was above normal in the East Gulf and South Atlantic States, in the Ohio Valley, the middle Plains, and in most of the far-western districts. It was less than normal in the Southwest and also over the Northeastern States and in the area between the upper Lakes and the Rocky Mountains, the deficiency becoming rather large over Minnesota, the Dakotas, Iowa and Wisconsin. No severe drought existed during the month over extensive areas, though the absence of sufficient precipitation was being felt in portions of the spring-wheat belt as the month closed.

SNOWFALL

Traces of snow only were reported from a few northern mountain States, but a total fall of 14 inches was recorded at a point in Wyoming.

RELATIVE HUMIDITY

Viewing the country as a whole there was a deficiency in the percentages of humidity over many sections, this being particularly large in portions of the Dakotas and some near-by areas, and also in most of the Southwest and in parts of the Northeast. There were some excesses in the Southeastern States, in the upper Lake region, in portions of the middle Plains, and locally in California and to the northward.